# MEGAPACK


Megapack is an all-in-one utility-scale energy storage system that is scalable to the space, power, and energy requirements of any site from 2 MWh to over 1 GWh. Megapack is optimized for cost, performance, and ease of installation, and includes a standard system warranty of up to 15 years.

## FULLY INTEGRATED SYSTEM

Megapack ships with battery modules, bi-directional inverter, thermal management system, and AC main breaker all pre-installed and pre-tested within a single enclosure. This turnkey system is designed to have the industry's fastest, lowest cost installation without sacrificing performance or reliability.

## OPTIMIZATION SOFTWARE

Proprietary optimization software, developed in parallel with the Megapack hardware, learns and predicts local energy patterns, offering autonomous charge and discharge and seamless SCADA integration. Fast-response controls can integrate co-located renewables and enable market participation.

## ENHANCED SYSTEM SAFETY

Parallel DC/DC converters, integrated heating and cooling at the cell level, and dedicated hazard venting are just a few of the safety and hazard mitigation features built into Megapack. Designed to meet international safety standards, Megapack helps ensure ease-of-permitting wherever it's installed.

## INDUSTRY-LEADING RELIABILITY

A vertically integrated product from hardware design and sourcing to software development, Megapack offers significant reliability advantages over the competition. These design advantages are exemplified by a cooling system optimized specifically for Megapack that provides superior heating and cooling while factoring its HVAC energy consumption into its performance, and module-level DC/DC converters that can keep the system running uninterrupted in case of a partial failure.

## LOWEST ENGINEERING, PROCUREMENT, AND CONSTRUCTION (EPC) COSTS

Megapack is shipped onsite fully assembled and pre-tested, offering customers the world's fastest utility-scale energy storage installation. Once on site, Megapack only requires seismic anchoring and connection of AC conductors and a communication cable. The EPC benefit is clear: no other current utility-scale solution offers such a simplified process.

## GLOBAL SERVICE FOOTPRINT

As a vertically-integrated manufacturer and supplier, Tesla provides a streamlined service offering on all components of Megapack. With Tesla, customers enjoy a single point of contact through all stages of product life. Our operational fleet of 2+ GWh provides valuable data that informs our maintenance models and our performance guarantees, and the entire Megapack system is covered by a standard warranty of up to 15 years, with the option of a 20-year Capacity Maintenance Agreement (CMA) in certain cases.

# MEGAPACK SPECIFICATIONS

*Specifications shown here are indicative and subject to change.*

Flexible offering designed for utility-scale projects
- Modular inverter Powerstages allow greater configuration flexibility
- Supports Capacity Maintenance Agreements (CMA)
- Integrate solar PV with DC coupling (future feature)

Proven inverter and battery technology drives design efficiency
- One Megapack includes up to 17 independent battery modules
- Configurable for 2 to 6+ hour charge/discharge cycles
- Best-in-class site-level energy density

Turnkey solution enables rapid and cost-effective deployment
- Up to 40% expected reduction in EPC costs compared to Powerpack
- Pre-assembled and pre-tested at Tesla's Gigafactory
- No DC connections required onsite

## ELECTRICAL

| | |
|---|---|
| **AC Voltage** | 400–480 VAC 3-phase |
| **Nominal Frequency** | 50 or 60 Hz |
| **Continuous Charge/Discharge Duration** | 2 to 6+ hours |
| **AC Power/Energy Available per Megapack**[1] | 2 hr: 1257 kW / 2514 kWh<br>4 hr: 739.5 kW / 2958 kWh |
| **Inverter Size (at 480 VAC)** | 2 hr: Scalable up to 1540 kVA<br>4 hr: Scalable up to 910 kVA |
| **PV** | Interface: Direct DC Coupled<br>Max VoC: 1500 Vdc<br>Max Imp: 2390 Adc |

Megapack is a customizable energy system capable of being sized according to customer needs. Below are specifictions for standard system sizes available without customization.

## STANDARD SYSTEM SPECIFICATIONS

| | AC Power/Energy Available per Megapack[1] | Roundtrip System Efficiency[1] |
|---|---|---|
| **2 Hour Light** | 1005.5 kW / 2011 kWh | 87.0% |
| **2 Hour Standard** | 1257 kW / 2514 kWh | 87.0% |
| **4 Hour Light** | 522 kW / 2088 kWh | 90.5% |
| **4 Hour Standard** | 739.5 kW / 2958 kWh | 90.5% |

[1] Nominal energy at 25°C (77°F) including thermal management loads, Day 1

## MECHANICAL AND MOUNTING

| | |
|---|---|
| **Ingress Ratings** | IP66/NEMA 3R (Main enclosure)<br>IP20 (Thermal system) |
| **Unit Dimensions** | W: 7125 mm (23 ft 5 in)<br>D: 1600 mm (5 ft 3 in)<br>H: 2516 mm (8 ft 3 in) |
| **Unit Maximum Weight**[2] | Standard: 25,400 kg (56,000 lbs)<br>Light: 19,700 kg (43.430 lbs) |
| **Operating Ambient Temperature** | –30°C to 50°C (–22°F to 122°F) |

[2] Optimized for global payload limits

## REGULATORY (Expected Listings)

| | |
|---|---|
| **Lithium-Ion Cells** | NRTL listed to UL 1642 |
| **System** | NRTL listed to UL 1973, 9540, 9540A, 1741 SA<br>IEEE 1547<br>Compliant to grid codes and safety standards of all major markets |

## COMMUNICATIONS

| | |
|---|---|
| **Protocol** | Modbus TCP<br>DNP3<br>Rest API |

## PV DC-COUPLED SPECIFICATIONS

Megapack is capable of being the grid connection point for solar PV plants. This is accomplished by integrating solar PV with Megapack using a Tesla PV Sidecar: a 16 input PV combiner box with disconnects and zonal monitoring. By eliminating the separate PV inverter, Tesla's DC-integrated solution reduces system level costs and minimizes the number of power conversion steps to improve overall site level efficiency. The Megapack architecture supports a wide range of DC/AC (solar PV) and power-energy (storage) ratios, providing the flexibility to optimize for any PV plus storage use case. Integrating the entire plant with a single control system, Tesla's solution provides a fast, seamless, and robust platform for solar PV ramp control and firm or dispatchable renewable power generation.

### ELECTRICAL - AC INTERFACE

| | |
|---|---|
| **Battery Power/Energy Available (Net AC) per Megapack**[1] | Scalable battery module quantity.<br>2 hr: Up to 1257 kW / 2514 kWh<br>4 hr: Up to 739.5 kW / 2958 kWh |
| **Shared Solar/Battery Inverter Size (at 480 VAC)** | Scalable up to 1540 kVA at 70kVA increments |

[1] Nominal energy at 25°C (77°F) including thermal management loads

### MECHANICAL AND MOUNTING

| | |
|---|---|
| **Ingress Ratings** | IP66/NEMA 3R (Main enclosure)<br>IP20 (Thermal system) |
| **Unit Dimensions** | W: 830 mm (2 ft 9 in)<br>D: 1600 mm (5 ft 3 in)<br>H: 2516 mm (8 ft 3 in) |
| **Unit Maximum Weight** | 500 kg (1100 lbs) for PV Sidecar |

### ELECTRICAL - PV DC INTERFACE

| | |
|---|---|
| **PV Interface Type** | Direct DC Coupled, via Tesla provided PV Integration Unit<br>No PV DC/DC Converter |
| **PV Interface Ratings** | Max VoC: 1500 Vdc<br>Max Imp: 2390 Adc |
| **Maximum Power Point Tracking** | MPPT Min V: 734 Vdc<br>MPPT Max V: 961 Vdc<br>Curtailment via MPPT or zonal disconnects |
| **PV Inputs** | Input Zone Count: 16<br>Input Size: 250-400 Adc<br>Contactors and IGBT disconnects per zone<br>Zonal current and voltage monitoring |

### COMMUNICATIONS

| | |
|---|---|
| **Protocol** | Modbus TCP<br>DNP3<br>Rest API |